

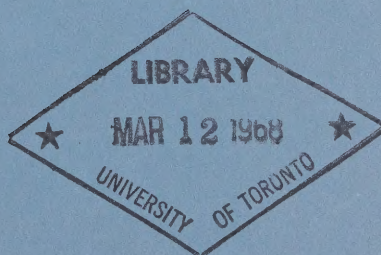


DEPARTMENT OF TRANSPORT  
METEOROLOGICAL BRANCH

# GUIDE TO THE CLIMATIC MAPS OF CANADA

BY  
M.K. THOMAS AND S.R. ANDERSON

CLI-1-67



OCTOBER 24, 1967





DEPARTMENT OF TRANSPORT  
METEOROLOGICAL BRANCH

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[General publication]

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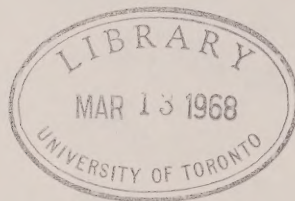
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## TABLE OF CONTENTS

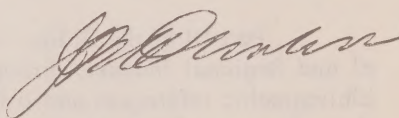
	Page
Foreword . . . . .	iii
Introduction . . . . .	iv
Part I - Index of National Maps . . . . .	I-1
Part II - Index of Regional or Provincial Maps . . . . .	II-1
Part III - Author Index . . . . .	III-1
Part IV - Subject Index . . . . .	IV-1
Appendix - Map and Atlas Projects in Preparation . . . . .	V-1

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## FOREWORD

This Guide to Climatic Maps of Canada has been compiled under the general direction of C.C. Boughner, Chief, Climatology Division, and is the first in a series of climatological manuals designed to provide assistance to those personnel engaged in supplying climatological services at the various Weather Offices across Canada. In addition, this booklet will, I believe, be a most useful reference for students of Canadian meteorology and climatology. Work on this project was begun in 1965 by a summer student assistant, and has been completed in the newly created Climatological Services Unit of the Climatology Division. It is hoped that this and future publications will provide much assistance to those who wish to know of the best available Canadian climatological information.



J.R.H. Noble,  
Director,  
Meteorological Branch,  
Department of Transport,  
Toronto, Ontario.

## GUIDE TO THE CLIMATIC MAPS OF CANADA

by

M.K. THOMAS and S.R. ANDERSON

## INTRODUCTION

This Guide has been prepared and published in order to assist professional and technical personnel in locating and using the most up-to-date climatic maps of Canada. It is not a complete listing of all climatic maps that have ever been published, but in general, deals only with the best standard references and with those that have been recently published. It will be necessary to periodically update this Guide to ensure its continuing usefulness.

Part I, the Index of National Climatic Maps of Canada, is arranged alphabetically by meteorological subjects, such as barometric pressure, rainfall, temperature, and so on while subheadings are arranged according to use for such parameters as means, extremes and frequencies. For example, since maps of mean values are those most frequently sought, mean values are listed in the index ahead of extremes and frequencies. Each item in the index contains the author's name, the year of publication, and the title of the book, article, paper, or circular. Abbreviations of the full titles are often used in this index, but in most cases the reference will be sufficient for the user to identify the publication in which the map is published.

Part II of the Guide consists of the Index of Regional and Provincial Maps arranged similarly to the National Index in Part I.

Part III of the Guide contains details of each publication listed in the National and Regional Indexes, arranged alphabetically by author. For each publication, bibliographic references and a list of maps are shown. Information regarding the sheet size, the approximate map scale, and the period of record from which the data were obtained is also included.

A subject index to the National and Regional Maps follows Part III. Where a subject may be referred to under two or more names, cross references are given.

References to Climatic Maps for oceanic areas bordering Canada are not included in Parts I and II of this Guide. However, atlases covering the three main oceanic areas have been published in the United States, and references to these are to be found in the author index under U.S. Office of Naval Operations.

There are several publications in preparation at Meteorological Branch Headquarters that contain climatic maps, and in order that potential users might be made aware of these maps, a brief description of several of the new publications expected to be available in the near future are given in the Appendix.

It is proposed to publish at a later date a companion Guide to Climatic Data, and subsequently to update all guides periodically. It is hoped that the preparation and publication of these guides will be of assistance in the provision of climatological services at the various Weather Offices of the Meteorological Branch, as well as providing assistance to students of Canadian climatology.

## ACKNOWLEDGEMENTS

G.R. Kendall, Meteorologist responsible for Data Utilization and Publications at Meteorological Branch Headquarters, has provided much advice in the preparation of this Guide. Mr. S.K. Horrick, a 1965 summer student assistant, prepared the first draft for a considerable portion of it, and the typing of the different manuscripts was supervised by Mrs. N. Moncrieff.

Climatology Division,  
Meteorological Branch,  
Department of Transport,  
October 24, 1967

M.K. Thomas  
S.R. Anderson



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## National Maps

## BAROMETRIC PRESSURE - Mean

## Monthly

U.S. Weather Bureau, 1952 - Normal weather charts for the Northern Hemisphere.

Potter, 1955 - Monthly mean sea-level pressure maps for Canada.

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

## BRIGHT SUNSHINE - Mean Number of Hours

## Annual

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

## Monthly

Thomas, 1953 - Climatological atlas of Canada.

## BRIGHT SUNSHINE - Percentage of Total Possible

## Annual

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

## CLIMATIC REGIONS

Sanderson, 1948 - The climate of Canada according to the new Thornthwaite classification.

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

Thomas and Kendall, 1957 - Meteorology section of the Canadian Oxford Atlas.

Boughner and Thomas, 1962 - The climate of Canada.

Chapman and Brown, 1966 - The climates of Canada for agriculture.

## CLOUDS - Mean Amounts

## Monthly

Vowinckel, 1962 - Cloud amount and type over the arctic.

## CLOUDS - Types

## Seasonal

Vowinckel, 1962 - Cloud amount and type over the arctic.

## CONTINENTALITY INDEX

McKay and Cook, 1963 - A preliminary map of continentality for Canada.

Connor, 1939 - The Climate of Manitoba.

## National Maps

### DEGREE DAYS (Growing) - Mean

#### Annual

- Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.
- Thomas and Kendall, 1957 - Meteorology section of the Canadian Oxford Atlas.
- Boughner, 1964 - The distribution of growing degree-days in Canada.
- Chapman and Brown, 1966 - The climates of Canada for agriculture.

#### Seasonal

- Boughner, 1964 - The distribution of growing degree-days in Canada.

### DEGREE DAYS (Heating) - Mean

#### Annual

- Boyd, 1965 - Climatic information for building design in Canada.

### EVAPOTRANSPIRATION - Mean

#### Annual

- Sanderson, 1948 - The climates of Canada according to the new Thornthwaite classification.
- Chapman and Brown, 1966 - The climates of Canada for agriculture.

### FOG (Frequency) - Mean Number of Days

#### Seasonal

- Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

### FREEZE-THAW FREQUENCIES - Mean

#### Annual

- Fraser, 1959 - Freeze-thaw frequencies and mechanical weathering in Canada.

### FROST - Mean Duration of Frost-Free Season

#### - Mean Dates of Frost-Free Season

#### Annual

- Boughner, Longley and Thomas, 1956 - Climatic summaries, Vol. 3.
- Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

## National Maps

## GROWING SEASON - Mean Duration

## Annual

- Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.  
Boughner, 1964 - The distribution of growing degree-days in Canada.  
Chapman and Brown, 1966 - The climates of Canada for agriculture.

## GROWING SEASON - Mean Dates

## Annual

- Boughner, 1964 - The distribution of growing degree-days in Canada.

## HUMIDITY (Dew Point) - Mean, Maximum

## Annual, Monthly

- Can. Met. Br., 1959 - Climatic summaries, Vol. 2.

## HUMIDITY (Mixing Ratio) - Mean

## Monthly

- Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.  
Can. Met. Br., 1959 - Climatic summaries, Vol. 2.

## HUMIDITY (Relative Humidity) - Mean

## Monthly

- Can. Met. Br., 1959 - Climatic summaries, Vol. 2.

## HUMIDITY (Vapour Pressure) - Mean

## Monthly

- Thomas, 1953 - Climatological atlas of Canada.

## HUMIDITY (Wet-bulb Temperature) - Mean

## Monthly

- Can. Met. Br., 1959 - Climatic summaries, Vol. 2.

## ICE - Mean Dates of Breakup and Freezep

## Annual

- Allen, 1964 - Breakup and freezep dates in Canada.

## National Maps

### ICE - Mean Extent of Ice Cover

Monthly, Weekly

Swithinbank, 1960 - Ice atlas of Arctic Canada.

### PERMAFROST - Southern Limit

Boyd, 1965 - Climatic information for building design in Canada.

### PRECIPITATION - Mean

Annual

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

Boughner and Thomas, 1962 - The climate of Canada.

Boyd, 1965 - Climatic information for building design in Canada.

Chapman and Brown, 1966 - The climates of Canada for agriculture.

Seasonal

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

Thomas and Kendall, 1957 - Meteorology section of the Canadian Oxford Atlas.

Chapman and Brown, 1966 - The climates of Canada for agriculture.

Monthly

Chapman and Brown, 1966 - The climates of Canada for agriculture.

### PRECIPITATION (Variation)

Annual

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

Sabbagh and Bryson, 1962 - An objective precipitation climatology of Canada.

Seasonal

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

Monthly

Walker, 1963 - Intermonthly precipitation changes in Canada.

### PRECIPITATION - Daily Extremes

Annual

Thomas, 1953 - Climatological atlas of Canada.

## National Maps

### PRECIPITATION (Frequency) - Mean Number of Days

#### Annual

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

#### Monthly

Thomas, 1953 - Climatological atlas of Canada.

### RADIATION - Mean

#### Monthly

Mateer, 1955 - A preliminary estimate of the average insolation in Canada.

### RAINFALL - Mean

#### Annual, Seasonal

Thomas, 1953 - Climatological atlas of Canada.

### RAINFALL - Extremes

#### Annual

Boyd, 1965 - Climatic information for building design in Canada.

### RAINFALL - Intensity, Return Periods

#### Annual

Bruce, 1959 - Rainfall intensity-duration-frequency maps for Canada.

Boyd, 1965 - Climatic information for building design in Canada.

### SNOW COVER - Mean Duration, Mean Dates, Mean Extremes

#### Annual

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

Potter, 1965 - Snow cover.

### SNOW COVER - Extreme

#### Annual

Potter, 1965 - Snow cover.

## National Maps

### SNOWFALL - Mean

#### Annual

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

Thomas, 1964 - Snowfall in Canada.

Thomas, 1964 - A survey of Great Lakes snowfall.

#### Monthly

Thomas, 1953 - Climatological atlas of Canada.

### SNOWFALL - Mean Number of Days

#### Annual

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

### SNOWFALL (Water Content)

Potter, 1965 - Water content of freshly fallen snow.

### SNOW LOADS

#### Annual

Boyd, 1965 - Climatic information for building design in Canada.

### STORM TRACKS (Frequency of Systems)

#### Monthly

Klein, 1957 - Principal tracks and mean frequencies of cyclones and anticyclones in the Northern Hemisphere.

### TEMPERATURE - Mean

#### Annual

Thomas, 1953 - Climatological atlas of Canada.

#### Monthly

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

Boughner and Thomas, 1962 - The climate of Canada.

Chapman and Brown, 1966 - The climates of Canada for agriculture.

## National Maps

## TEMPERATURE - Extremes

## Annual

Thomas and Boyd, 1957 - Wind chill in northern Canada.

Can. Met. Br., 1957 - Weather and climate section of the Atlas of Canada.

Chapman and Brown, 1966 - The climates of Canada for agriculture.

## TEMPERATURES - Mean Extremes

## Annual

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

## Monthly

Thomas, 1953 - Climatological atlas of Canada.

## TEMPERATURE (Design) Mean

## Seasonal

Boyd, 1965 - Climatic information for building design in Canada.

## TEMPERATURE (Frequency) - Mean Number of Days at or Below Certain Thresholds

## Annual

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

Rayner, 1961 - Atlas of surface temperatures frequencies for North America and Greenland.

Hagglund and Thompson, 1964 - A study of sub-zero Canadian temperature.

## TEMPERATURE (Variability)

## Annual

Kendall and Anderson, 1966 - Standard deviations of monthly and annual mean temperatures.

## Monthly

Sumner, 1953 - Standard deviation of mean monthly temperature in Anglo-America.

Kendall and Anderson, 1966 - Standard deviations of monthly and annual mean temperatures.

## THUNDERSTORM - Frequency, Mean Number of Days

## Annual, Seasonal, Monthly

Kendall and Petrie, 1962 - The frequency of thunderstorm days in Canada.

## National Maps

### UPPER AIR PRESSURE HEIGHTS - Mean

#### Monthly

- U.S. Weather Bureau, 1952 - Normal weather charts for the Northern Hemisphere.
- Henry, 1957 - Maps of upper winds over Canada.
- Titus, 1967 - Upper air climate of Canada - Charts.

### UPPER AIR PRESSURE THICKNESS - Mean

#### Monthly

- U.S. Weather Bureau, 1952 - Normal weather charts for the Northern Hemisphere.

### UPPER AIR TEMPERATURE - Mean

#### Monthly

- U.S. Weather Bureau, 1952 - Normal weather charts for the Northern Hemisphere.
- Titus, 1967 - Upper air climate of Canada - Charts.

### UPPER WINDS - Mean, Variability

#### Seasonal

- Henry, 1957 - Maps of upper winds over Canada.

### WATER BALANCE - Mean

#### Annual

- Sanderson, 1948 - The climate of Canada according to the new Thornthwaite classification.
- Chapman and Brown, 1966 - The climates of Canada for agriculture.

### WATER BALANCE - Variation

#### Seasonal

- Sanderson, 1948 - The climate of Canada according to the new Thornthwaite classification.

### WIND - Mean Speed

#### Seasonal

- Thomas, 1953 - Climatological atlas of Canada.

## National Maps

### WIND - Gust Speeds

#### Annual

Can. Met. Br., 1959 - Climatic summaries, Vol. 2.

Boyd, 1965 - Climatic information for building design in Canada.

#### Monthly

Thomas, 1953 - Climatological atlas of Canada.

### WIND (Direction Frequencies, Wind Roses) - Mean

#### Annual

Thomas, 1953 - Climatological atlas of Canada.

#### Seasonal

Can. Met. Br., 1957 - Weather and climate section of Atlas of Canada.

#### Monthly

Can. Met. Br., 1959 - Climatic summaries, Vol. 2.



## Regional and Provincial Maps

## AIR MASSES - Mean Trajectories, Percentage Frequencies

## Monthly

Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## BAROMETRIC PRESSURE - Mean

## Monthly

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T.

Rae, 1951 - The climate of the Canadian Arctic Archipelago.

Kendrew and Currie, 1955 - The climate of central Canada.

Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## BRIGHT SUNSHINE - Mean Number of Hours

## Annual

Que.

Bolduc and Villeneuve, 1964 - Sommaire héliométrique du Québec.

## Seasonal

Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

## Monthly

Que.

Bolduc and Villeneuve, 1964 - Sommaire héliométrique du Québec.

## BRIGHT SUNSHINE - Percentage of Total Possible

## Annual

Que.

Bolduc and Villeneuve, 1964 - Sommaire héliométrique du Québec.

## Seasonal

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

## Regional and Provincial Maps

### CLIMATIC REGIONS

#### B.C.

Chapman and Turner, 1956 - B.C. atlas of resources.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

#### Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

#### N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

#### Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

#### Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

#### N.S., N.B., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

### CLOUDS - Mean Amounts

#### Annual

##### Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

#### Seasonal

##### N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

#### Monthly

##### Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

### CONTINENTALITY INDEX

#### Ont.

Kopec, 1965 - Continentality around the Great Lakes.

### DEGREE DAYS (Freezing-Thawing) - Mean

#### Seasonal

##### Y.T., N.W.T.

Thompson, 1963 - Freezing and thawing indices in northern Canada.

Thompson, 1963 - Air temperatures in northern Canada.

## Regional and Provincial Maps

## DEGREE DAYS (Growing) - Mean

Annual

B.C.

Chapman and Turner, 1956 - B.C. atlas of resources.

Seasonal

Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

## DEGREE DAYS (Heating) - Mean

Annual

Y.T., N.W.T.

Thomas and Boyd, 1957 - Wind chill in northern Canada.

## EVAPORATION - Mean and Mean Extreme

Annual

Alta., Sask., Man.

Berry and Stichling, 1954 - Evaporation from lakes and reservoirs in the Northern Plains region in North America.

Seasonal and Monthly

Alta., Sask., Man.

Berry and Stichling, 1954 - Evaporation from lakes and reservoirs in the Northern Plains region in North America.

Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

Bolduc and Villeneuve, 1965 - Sommaire des données évaporométriques du Québec.

## EVAPOTRANSPIRATION - Mean

Annual

Ont.

Sanderson, 1950 - Moisture relationships in southern Ontario.

Chapman, 1953 - Climate of northern Ontario.

Nfld.

Hare, 1952 - The climate of Newfoundland.

Seasonal

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

## Regional and Provincial Maps

### FOG (Frequency) - Mean Number of Days

#### Annual

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Nfld.

Hare, 1952 - The climate of Newfoundland.

### FREEZING SEASON - Mean Dates of Limits

#### Annual

Y.T., N.W.T.

Thompson, 1963 - Freezing and thawing indices in northern Canada.

Thompson, 1963 - Air temperatures in northern Canada.

### FRONTS - Mean Positions

#### Seasonal

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

#### Monthly

B.C.

Walker, 1961 - A synoptic climatology for parts of the western cordillera.

Que., Nfld.

Hare and Longley, et al. 1953 - The climate of Quebec and Labrador.

### FROST - Mean Duration of Frost-Free Season

#### Annual

B.C.

Chapman and Turner, 1956 - B.C. atlas of resources.

Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

N.B., N.S., P.E.I.

Putnam 1940 - The climate of the Maritime Provinces.

## Regional and Provincial Maps

## FROST - Mean Dates of Frost-Free Season

## Annual

Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

## FROST - Median Dates, Range of Median Dates, Percentages

## Annual

Ont.

Chapman, 1953 - The climate of northern Ontario.

## GROWING SEASON - Mean Dates and Duration

## Annual

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Nfld.

Hare, 1952 - The climate of Newfoundland.

## HAIL (Frequency) - Number of Destructive Hailstorms

## Annual

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

## HUMIDITY (Mixing Ratio) - Mean

## Monthly

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

Ont.

Chapman, 1953 - The climate of northern Ontario.

Regional and Provincial Maps

HUMIDITY (Persisting Dewpoints)

Monthly

Alta., Sask., Man.

McKay, 1963 - Persisting dewpoints in the Prairie Provinces.

HUMIDITY (Relative Humidity) - Mean

Annual

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Seasonal

Que.

Bolduc and Villeneuve, 1966 - Sommaire des données hygrométriques du Québec.

Monthly

Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

Bolduc and Villeneuve, 1966 - Sommaire des données hygrométriques du Québec.

ICE (Extent of Ice Cover)

Monthly

Nfld.

Hare, 1952 - The climate of Newfoundland.

PERMAFROST - Southern Limit

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

PRECIPITATION - Mean

Annual

B.C.

Chapman and Turner, 1956 - B.C. atlas of resources.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

Walker, 1961 - A synoptic climatology for parts of the western cordillera.

## Regional and Provincial Maps

## PRECIPITATION - Mean (Cont'd)

## Annual

## Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

## N.W.T.

Kendrew and Currie, 1955 - The climate of central Canada.

## Alta., Sask., Man.

McKay, 1961 - A detailed map of Prairie average annual precipitation.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

## Ont.

Chapman and Putnam, 1938 - The climate of southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

## Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

## Nfld.

Hare, 1952 - The climate of Newfoundland.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## Seasonal - Bimonthly

## Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

## Monthly

## B.C.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

## N.W.T., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

## Alta.

Kendrew and Currie, 1955 - The climate of central Canada.

Muttitt, 1961 - Spring and summer rainfall patterns in Alberta.

## Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

## PRECIPITATION (Per cent of Annual) - Mean

## Monthly

## Man.

Connor, 1939 - The climate of Manitoba.

## Regional and Provincial Maps

### PRECIPITATION (Variation)

#### Annual

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie 1955 - The climate of central Canada.

#### Seasonal

Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for Agriculture.

### PRECIPITATION (Frequency) - Mean Number of Days

#### Annual

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

### PRECIPITATION (Drought Frequency)

#### Seasonal

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

### PRECIPITATION - Extremes

#### Annual

Alta., Sask., Man.

McKay, 1965 - Statistical estimates of precipitation extremes for the Prairie Provinces.

### PRECIPITATION (Fourier Analysis)

#### Annual - Monthly

B.C., Y.T., N.W.T., Alta., Sask., Man.

Walker, 1964 - Analysis of normal monthly precipitation over Alaska and western Canada.

## Regional and Provincial Maps

### PRECIPITATION (Characteristics by Wind Direction)

#### Annual - Seasonal

##### B.C.

Walker, 1961 - A synoptic climatology for parts of the western cordillera.

### RAINFALL - Mean

#### Seasonal

##### Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

##### N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

### RAINFALL - Mean Number of Days

#### Annual

##### Ont.

Chapman, 1953 - The climate of northern Ontario.

##### N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

### RAINFALL - Extremes

#### Annual

##### Alta., Sask., Man.

McKay, 1962 - Statistical estimates of probable maximum rainfall in the Prairie Provinces.

McKay, 1965 - Statistical estimates of precipitation extremes for the Prairie Provinces.

### RAINFALL - Percentage of Annual Precipitation

#### Summer

##### Alta., Sask., Man.

McKay, 1961 - A detailed map of Prairie average annual precipitation.

### RAINFALL - Intensity, Return Periods

##### B.C.

Murray, 1964 - Rainfall-intensity-duration-frequency maps for B.C.

##### Alta.

Storr, 1963 - Maximum one-day rainfall frequencies in Alberta.

Regional and Provincial Maps

RAINFALL - Intensity, Return Periods (Cont'd)

Sask.

Storr, 1964 - Maximum one-day rainfall frequencies in Saskatchewan.

Ont.

Sporns, 1963 - Rainfall-intensity-duration-frequency maps for Ontario.

SNOWFALL - Mean

Annual

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

Ont.

Chapman and Putnam, 1938 - The climate of southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

Richards and Derco, 1963 - The role of "lake effect storms" in the  
distribution of snowfall in southern Ontario.

Thomas, 1964 - A survey of Great Lakes snowfall.

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Nfld.

Hare, 1952 - The climate of Newfoundland.

Monthly

Ont.

Richards and Derco, 1963 - The role of "lake effect storms" in the  
distribution of snowfall in southern Ontario.

Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

SNOWFALL - Extreme

Annual

Ont.

Thomas, 1964 - A survey of Great Lakes snowfall.

SNOWFALL - Mean Percent of Precipitation

Annual

Man.

Connor, 1939 - The climate of Manitoba.

## Regional and Provincial Maps

## SNOWFALL - Mean Number of Days

## Annual

## Ont.

Thomas, 1964 - A survey of Great Lakes snowfall.

## TEMPERATURE - Mean

## Annual

## Y.T., N.W.T.

Thompson, 1963 - Air temperatures in northern Canada.

## Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

## Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

## Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

## N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

## Seasonal

## Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

## Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

## Monthly

## B.C.

Chapman and Turner, 1956 - B.C. atlas of resources.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

## Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

Thomas and Boyd, 1957 - Wind chill in northern Canada.

Thompson, 1963 - Air temperatures in northern Canada.

## N.W.T.

Rae, 1951 - The climate of the Canadian Arctic Archipelago.

Kendrew and Currie, 1955 - The climate of central Canada.

Thomas and Boyd, 1957 - Wind chill in northern Canada.

Thompson, 1963 - Air temperatures in northern Canada.

## Alta., Sask.

Kendrew and Currie, 1955 - The climate of central Canada.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

Regional and Provincial Maps

TEMPERATURE - Mean (Cont'd)

Monthly

Man.

Connor, 1939 - The climate of Manitoba.

Kendrew and Currie, 1955 - The climate of central Canada.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

Hare, Longley, et al. - 1953 - The climate of Quebec and Labrador.

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Nfld.

Hare, 1952 - The climate of Newfoundland.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

TEMPERATURE - Extremes

Annual

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

N.B.

Putnam, 1940 - The climate of the Maritime Provinces.

N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Petitpas and Hornstein; 1963 - Plant hardiness zone map.

TEMPERATURE - Mean Extremes

Annual

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

## Regional and Provincial Maps

## TEMPERATURE - Mean Extremes (Cont'd)

## Monthly

## Man.

Connor, 1939 - The climate of Manitoba.

## Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

## Nfld.

Hare, 1952 - The climate of Newfoundland.

## TEMPERATURE - Mean Daily Range

## Annual

## B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

## N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

## Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

## N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

## Monthly

## Ont.

Chapman, 1953 - The climate of northern Ontario

## Que.

Villeneuve, 1946 - Climatic conditions of Quebec.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## TEMPERATURE - Mean Range

## Annual

## N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

## TEMPERATURES - Mean Dates of Persistent Thaw

## Annual

## N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

Regional and Provincial Maps

TEMPERATURES - Mean Dates of Persistent Thaw (Cont'd)

Annual

Nfld.

Hare, 1952 - The climate of Newfoundland.

TEMPERATURE - Mean Duration of Persistent Thaw

Annual

Nfld.

Hare, 1952 - The climate of Newfoundland.

TEMPERATURE - Mean Percentage Frequency of "Thaw Days"

Annual

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

TEMPERATURE (Frequency) - Mean Number of Days Below or Above certain Thresholds

Annual - Monthly

Que.

Bolduc and Villeneuve, 1966 - Jours de chaleur du Québec.

TEMPERATURE - Mean Deviation From Latitudinal Mean

Annual

Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

TEMPERATURE - Mean Daily Extremes by Wind Direction

Annual - Seasonal

B.C.

Walker, 1961 - A synoptic climatology for parts of the western cordillera.

THUNDERSTORMS (Frequency) - Mean Number of Days

Annual

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

## Regional and Provincial Maps

## THUNDERSTORMS (Frequency) - Mean Number of Days (Cont'd)

## Annual

## Ont.

Haacke, 1964 - The frequency of thunderstorm occurrence in Ontario.

## Seasonal

## B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

## N.W.T., Alta., Sask., Man.

Kendrew and Currie, 1955 - The climate of central Canada.

## Monthly

## Ont.

Haacke, 1964 - The frequency of thunderstorm occurrence in Ontario.

## UPPER AIR PRECIPITABLE WATER - Mean, Means by Wind Direction

## Monthly

## B.C.

Walker, 1961 - A synoptic climatology for parts of the western cordillera.

## WATER BALANCE - Mean

## Annual

## Ont.

Sanderson, 1948 - The climates of Canada according to the new  
Thornthwaite classification.

Sanderson, 1950 - Moisture relationships in southern Ontario.

Chapman, 1953 - The climate of northern Ontario.

## Nfld.

Hare, 1952 - The climate of Newfoundland.

## WATER TEMPERATURE - Mean

## Seasonal

## Que., Nfld.

Hare, Longley, et al. 1953 - The climate of Quebec and Labrador.

## Monthly

## Ont.

Miller, 1952 - Surface temperatures of the Great Lakes.

## Nfld.

Hare, 1952 - The climate of Newfoundland.

Regional and Provincial Maps

WIND - Mean Speed

Seasonal

Alta., Sask., Man.

McKay, 1965 - Climatic maps of the Prairie Provinces for agriculture.

N.B., N.S., P.E.I.

Putnam, 1940 - The climate of the Maritime Provinces.

Monthly

Y.T., N.W.T., Sask., Man., Ont., Que.

Thomas and Boyd, 1957 - Wind chill in northern Canada.

WIND (Direction Frequencies, Wind Roses) - Mean

Annual

Ont.

Putnam and Chapman, 1938 - The climate of southern Ontario.

Monthly

B.C., Y.T.

Kendrew and Kerr, 1956 - The climate of B.C. and Y.T.

WIND CHILL - Mean

Annual - Monthly

Y.T., N.W.T., Sask., Man., Ont., Que.

Thomas and Boyd, 1957 - Wind chill in northern Canada.

## ALLEN, W.T.R.

Break-up and freeze-up dates in Canada. Dept. of Transport, Met. Br., CIR-4116, ICE-17. 1 Oct. 1964. 201p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:32,000,000

## List of Maps

- |        |   |
|--------|---|
| Fig. 2 | Mean dates of the initial breaking of ice in rivers.                                      |
| 3      | Mean dates of the clearing of ice from rivers.  |
| 4      | Mean dates of the initial breaking up of ice on lakes, bays, etc.                         |
| 5      | Mean dates of the clearing of ice from lakes, bays, etc.                                  |
| 6      | Mean dates of the first appearance of ice in rivers.                                      |
| 7      | Mean dates of the freeze over of rivers.  |
| 8      | Mean dates of the first appearance of ice in lakes, bays, etc.                            |
| 9      | Mean dates of the freeze-over of lakes, bays, etc.  |
| 10     | Difference (days) - Mean clearing date of rivers minus mean clearing date of lakes.       |
| 11     | Difference (days) - Mean freeze-over date of rivers minus mean freeze-over date of lakes. |
| 12     | Mean number of days between clearing of lakes, and initial ice formation in lakes.        |

Data: In preparing these maps, the mean date of each phenomenon was determined for each station for which five or more years of records, not necessarily consecutive, were available. These data were compiled over the period 1900 - 1963.

## BERRY, W.M. and W. Stichling

Evaporation from lakes and reservoirs in the Northern Plains region in North America. International Union of Geodesy and Geophysics, Surface Water Commission, Rome General Assembly, 1954. Vol. III. p.121-134.

Sheet size: 7" x 10½"

Map scale:

## List of Maps

- |        |  |
|--------|--|
| Fig. 6 | Mean annual evaporation from lakes and reservoirs. |
| 7      | Mean summer evaporation from lakes and reservoirs. |
| 8      | Mean July evaporation from lakes and reservoirs.   |

Data: All available data over the period 1901 - 1950 were analyzed.

**BOLDUC, A and G.O. VILLENEUVE**

Sommaire héliométrique du Québec. Ministère des Richesses Naturelles du Québec, Service de Météorologie, M-13 Québec, 1964. 103p. et 15 cartes.

Sheet size: 6 1/2" x 9 3/4"

Map scale: 1:10,000,000

**List of Maps**

- |          |   |
|----------|---|
| Carte II | Durée annuelle moyenne de l'insolation durant la période 1954 - 1963.               |
| III      | Pourcentage annuel moyen de l'insolation durant la période 1954 - 1963.             |
| IV - XV  | Durée moyenne de l'insolation en janvier au décembre durant la période 1954 - 1963. |

**Data:** The maps are based on data from 30 stations recording the hours of bright sunshine over the period 1954 - 1963.

**BOLDUC, A. and G.O. VILLENEUVE**

Sommaire des données évaporométriques du Québec. Ministère des Richesses Naturelles du Québec, Service de Météorologie, M-15 Québec, 1965. 182p. 13 cartes.

Sheet size: 6 3/4" x 9 3/4"

Map scale: 1:10,000,000

List of Maps

- |       |          |  |
|-------|----------|--|
| Carte | I - V    | Évaporation moyenne en mai au septembre durant la période 1954-63. |
|       | VI       | Évaporation saisonnière durant la période 1954-63.                 |
|       | VII - XI | Évaporation moyenne en mai au septembre durant la période 1944-63. |
|       | XII      | Évaporation saisonnière durant la période 1944-63.                 |

Data: The evaporation maps for the period 1954-63 are based on data from 152 stations while the 1944-63 maps are based on data from 73 stations.

**BOLDUC, A. and G.O. VILLENEUVE**

Sommaire des données hygrométriques du Québec. Ministère des Richesses Naturelles du Québec, Service de Météorologie, M-19 Québec, 1966. 43p. et 8 cartes.

Sheet size: 6 1/2" x 9 3/4"

Map scale: 1:10,000,000

**List of Maps**

Carte	I - V	Humidité relative moyenne en mai au septembre durant la période 1955-64.
	VI	Humidité relative moyenne saisonnière durant la période 1955-64.
	VII	Humidité relative moyenne saisonnière durant la période 1945-64.

**Data:** The maps were constructed from data from 137 stations for the period 1955-64 and from 80 stations for the period 1945-64.

**BOLDUC, A. and G.O. VILLENEUVE**

Jours de chaleur au Québec. Ministère des Richesses Naturelles du Québec, Service de Météorologie, MP-2 Québec, 1966. 7p. et 7 cartes.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:7,000,000

List of Maps

- |           |  |
|-----------|--|
| Carte 2-6 | Chrono-isothermes de 80 degrés fahrenheit en mai au septembre durant la période 1946-1965. |
| 7         | Chrono-isothermes annuels de 80 degrés fahrenheit durant la période 1946-1965.             |

Data: Data from 122 stations were used in preparing these maps.

BOUGHNER, C.C., R.W. LONGLEY and M.K. THOMAS

Climatic summaries for selected meteorological stations in Canada. Vol. III, Frost Data. Dept. of Transport, Met. Div., Toronto, 1956. 94p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:16,000,000

#### List of Maps

Mean date of the last occurrence of a temperature of  $32^{\circ}$  in spring.

Mean date of the first occurrence of a temperature of  $32^{\circ}$  in autumn.

Mean annual frost-free period.

Data: The maps are based on data from approximately 1300 stations with varying lengths of record up to 1950. In drawing the maps the greatest weight was placed on stations with the longest records while the short records have been used with caution and some reservations.

BOUGHNER, C.C. and M.K. THOMAS

The climate of Canada. Canada yearbook. Text 1959, page 23-50, Tables 1960, page 31-77. (Reprinted, Dept. of Transport, Met. Br., 1962. 74p.)

Sheet size: 6" x 9"

Map scale: 1:44,000,000

List of Maps

- |        |  |
|--------|--|
| Fig. 1 | Mean daily temperature in Canada January.  |
| 2      | Mean daily temperature in Canada July.     |
| 3      | Mean annual total precipitation in Canada. |
| 4      | Climatic regions of Canada.                |

Data: Data for the maps in this booklet are based on the standard normal period 1921-1950.

## BOUGHNER, C.C.

The distribution of growing degree-days in Canada. Dept. of Transport, Met. Br., Canadian Meteorological Memoir No. 17, 1964. 40p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:32,000,000

## List of Maps

- |        |  |
|--------|--|
| Fig. 2 | Mean annual growing degree-days above 42°F.  |
| 3      | Mean date of beginning of effective growing season.                                |
| 4      | Mean date of end of effective growing season.                                      |
| 5      | Mean annual length (in days) of effective growing season.                          |
| 6      | Mean number of growing degree-days above 42°F during the effective growing season. |
| 7      | Freeze free index.   |
| 8      | Mean number of growing degree-days above 42°F during frost free season.            |

Data: Data were obtained from 120 selected stations for the period 1950-1959, and from an additional 84 stations for the period 1957-1961. These latter data were adjusted to the 1950-1959 period.

## BOYD, D.W.

Climatic information for building design in Canada, 1965. Supplement No. 1 to the National Building Code of Canada. Associate committee on the National Building Code, National Research Council, Ottawa. NRC No. 8329. 41p.

Sheet size: 6" x 9"

Map scale: 1:24,000,000

## List of Maps

- |        |   |  |
|--------|---|--|
| Charts | 1 | Winter design temperature $2\frac{1}{2}$ per cent basis. |
|        | 2 | Winter design temperature 1 per cent basis.              |
|        | 3 | Annual total degree days below 65°F.                     |
|        | 4 | Fifteen minute rainfall ten-year return period.          |
|        | 5 | Maximum one-day rainfall.                                |
|        | 6 | Annual total precipitation.                              |
|        | 7 | Maximum snow load on the ground.                         |
|        | 8 | Wind gust speed thirty-year return period.               |
|        | 9 | Approximate southern limit of permafrost.                |

Data: Winter design temperatures were obtained from 118 stations for the 1951-1960. Annual degree days below 65°F were computed for 600 stations using the monthly mean daily temperature and its standard deviation based on the period 1931-1960. The rainfall chart is a revision of corresponding charts by Thomas and Bruce. Additional data since Bruce's publication and information from USWB publications have been used in this revision. Maximum one-day rainfall data have been obtained for several hundred stations with previous periods of record of between 20 and 30 years. The mean annual total precipitation normals for the period 1921-1950 were used in preparing chart 6. Snow load data were obtained by analysing the annual maximum depths of snow on the ground for periods ranging from 10 to 18 years for over 200 stations. The annual maximum hourly mileages for over 100 stations for periods from 10 to 22 years were used in preparing the map on wind loads.

BRUCE, J.P.

Rainfall intensity-duration-frequency maps for Canada. Dept. of Transport, Met. Br., CIR-3243, TEC-308. Aug. 28, 1959. 9p. 17 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:29,000,000

List of Maps

Fig. 2-16     5 minute, 10 minute, 15 minute, 30 minute and  
60 minute rainfalls for 5 year, 10 year and 25 year  
periods.

Data: Rainfall intensities for nine stations with records varying from eight to forty years were augmented by an analysis of six-hourly rain amounts from eighty-five stations with at least fourteen years of record over the years 1941-1958.

## CANADA, METEOROLOGICAL BRANCH

Weather and climate section of the Atlas of Canada. (51 climatic and weather maps).  
Dept. of Mines and Technical Surveys, 1957.

Sheet size: 15" x 20½"

Map scale: 1:20,000,000  
(except where otherwise noted)

## List of Maps

- |           |   |
|-----------|---|
| Plates 19 | Atmospheric pressure - January, April, July and October mean sea level pressure.  |
| 20        | Wind and sunshine - direction frequencies of winter, direction frequencies of summer winds, mean annual total hours of bright sunshine, mean annual percentage of total daylight hours with bright sunshine.  |
| 21        | Seasonal temperatures - January, April, July and October mean daily temperature.  |
| 22        | Temperature ranges - mean annual maximum and minimum temperatures, extreme highest and lowest recorded temperatures, mean annual number of days with a minimum temperature 0°F or lower (scale 1:50,000,000), mean annual number of days with a maximum temperature of 90°F or higher (scale 1:50,000,000). |
| 23        | Frost-mean annual frost-free period (1:10,000,000), mean date of first occurrence of a temperature of 32°F in fall, mean date of the last occurrence of a temperature of 32°F in spring.  |
| 24        | Growing seasons - mean annual length of growing season, mean annual number of degree days above 42°F, mean growing season precipitation, variability of growing season precipitation.   |
| 25        | Annual precipitation - mean annual total precipitation (1:10,000,000), mean annual total snowfall.  |
| 26        | Precipitation days and precipitation variability - mean annual number of days with measurable precipitation and snowfall variability of annual precipitation (1:10,000,000).  |
| 27        | Seasonal precipitation - mean spring, summer, fall and winter precipitation.  |
| 28        | Snow cover - mean date of first and last snow cover, mean annual number of days with snow cover, mean annual maximum depth of snow.   |

## List of Maps (Cont'd)

- Plates 29      Humidity and fog - January and July mean mixing  
ratio, mean number of days with fog, winter, spring  
summer and fall.  
30      Climatic regions (1:10,000,000).

Data: Atmospheric pressure data were obtained for 200 stations for the period 1940-1949 except for the area north of  $72\frac{1}{2}^{\circ}\text{N}$  where data for the period 1948-1953 were adjusted to the 1940-1949 period. Bright sunshine data were based on 20 to 50 years of record. All available wind data for 125 stations were used in preparing the wind maps. Temperature and precipitation data were based on the period 1921-1950. Humidity and snow cover information was based on the period 1941-1950.

CANADA, METEOROLOGICAL BRANCH

Climatic summaries for selected meteorological stations in Canada. Vol. II (Revised)  
- Humidity and Wind Data. Dept. of Transport, Met. Br., Toronto, 1959. 141p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:29,000,000

List of Maps

Mean monthly mixing ratios for January, April, July,  
October.

Mean monthly dew point for January, July.

Maximum observed dew point temperatures (1941-1957).

Mean July relative humidity.

Mean July wet-bulb temperature.

Monthly (January, July) and annual wind roses, direction  
frequencies of winds at selected stations.

Computed maximum gust speed.

Data: Humidity data from approximately 200 stations for the decade 1941-1950 were used. Wind data from all stations with at least five years of record during the period 1937-1954 were summarized.

## CHAPMAN, J.D. and D.B. TURNER (Editors)

British Columbia Atlas of Resources. British Columbia National Resources Conference, 1956. Climatic maps p.14-22.

Sheet size:  $17\frac{1}{2}$ " x 22"

Map scale: 1:3,500,000

## List of Maps

- Map No. 7 Annual precipitation.  
9 Mean daily temperatures for January and July,  
frost-free days, accumulated temperature  
(scale 1:8,000,000).  
10 Climatic regions.

Data: Data were obtained from (a) Climatic summaries for selected meteorological stations in Canada Volume I and its Addendum, (b) Frost-free season in British Columbia.

## CHAPMAN, L.J.

The climate of northern Ontario. Can. J. Agric. Sci., 33:1:41-73. Jan.-Feb. 1953.

Sheet size: 7" x 10"

Map scale: 1:12,000,000

## List of Maps

- Fig. 3-14 Monthly isotherms from January to December.  
15 Lowest temperature on record.  
16 Mean daily range of temperature in July.  
17 Start of growing season.  
18 End of growing season.  
19 Average length of growing season.  
20 The date after which 50 per cent of the last spring frosts occur.  
21 The date before which 50 per cent of the first fall frosts occur.  
22 Number of days between median dates.  
23 The percentage of last frosts after June 14, and of first frosts before Sept. 1.  
24 Potential evapotranspiration.  
25 Average annual precipitation.  
26 Average annual snowfall.  
27 Number of rainy days in a year (1919-1939).  
28 Annual water surplus.  
29 Annual water deficiency.  
30-31 Average mixing ratio January and July.  
32 Climatic regions of northern Ontario.

Data: The data were calculated from records up to the end of 1947.

## CHAPMAN, L.J. and D.M. BROWN

The climates of Canada for Agriculture. The Canada Land Inventory Report No. 3 1966. (24p. + 24 fig.).

Sheet size: 11" x 15" folded to 8½" x 11" Map scale: 1:9,000,000

## List of Maps

- Fig. 4 July mean temperature.  
5 January mean temperature.  
6 Mean annual minimum temperature.  
7 Start of the growing season (above 42°F mean temperature).  
8 End of the growing season (above 42°F mean temperature).  
9 Degree days above 42°F.  
10 Mean spring frost date.  
11 Mean fall frost date.  
12 Mean "frost-free" period (days).  
13 Corn heat units.  
14 Mean monthly precipitation.  
15 Average annual precipitation.  
16 Average May to September precipitation.  
17 Potential evapotranspiration.  
19 Average annual water deficiency.  
20 Average annual actual evapotranspiration.  
22 Temperature zones.  
23 Moisture classes.  
24 Climatic regions for agriculture.

Data: The frost and corn heat units maps are based on data for the period 1931-1960 while all other maps are based on the period 1921-1950.

## CONNOR, A.J.

The climate of Manitoba. Economic Survey Board, Province of Manitoba (Winnipeg)  
Project No. 15, 1939. 163p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:7,000,000

## List of Maps

Frontispiece	Percentage of average continentality.
Fig. 1-12	Average monthly maximum temperature January to December.
13-24	Average monthly mean maximum temperature January to December.
25-36	Average monthly minimum temperature, January to December.
37-48	Average monthly mean minimum temperature, January to December.
49-54	Latest, earliest, and average date of early and late frosts ( $29.5^{\circ}$ ).
55-60	Latest, earliest, and average dates of early and late frosts ( $33^{\circ}$ ).
61-62	Average lengths of frost-free period ( $33^{\circ}$ , $29.5^{\circ}$ ).
63	Total annual precipitation.
64	Total annual snowfall.
65	Amount of snowfall in per cent of total precipitation.
66	March precipitation in per cent of annual total.
67-69	Total precipitation for April, May, June and July; April and May; June and July.
70-73	April, May, June, July precipitation in per cent of annual total.

Data: All available data up to 1937 were used.

FRASER, J.K.

Freeze-thaw frequencies and mechanical weathering in Canada. Arctic, 12:1:40-53.  
March 1959.

Sheet size: 7" x 10"

Map scale: 1:35,000,000

List of Maps

Fig. 6        Distribution of average annual freeze-thaw frequencies  
              in Canada.

Data: Data were analyzed from 42 stations for a period of 3-5 years.

## HAACKE, L.C.

The frequency of thunderstorm occurrence in Ontario. Dept. of Transport, Met. Br., CIR-4160, TEC-546. 31 Dec., 1964. 6p. 7 figs. 2 tables.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale 1:8,800,000

## List of Maps

- Fig. 1      Annual total number of thunderstorms.  
2-6      Number of thunderstorms in May, June, July,  
            August and September.

Data: Data from 37 stations for the 20-year period 1941-1960 as obtained from "The Frequency of Thunderstorm Days in Canada" by Kendall and Petrie were supplemented by data from a few climatological stations using the period 1958-1963.

## HAGGLUND, M.G. and H.A. THOMPSON

A study of sub-zero Canadian temperatures. Canadian Meteorological Memoirs No. 16  
Dept. of Transport, Met. Br., 1964. 77p.

Sheet size: 8½" x 11"

Map scale: 1:40,000,000

## List of Maps

- Fig. 2-38 Frequency of daily minimum temperature at or below  
-10°F, -20°F, -30°F during October; -10°F, -20°F,  
-30°F, -40°F, -50°F during November; -10°F, -20°F,  
-30°F, -40°F, -50°F, -60°F during December, January,  
February, March; -10°F, -20°F, -30°F, -40°F during  
April; -10°F during May.
- 39 Duration days of the whole winter season.
- 40 Duration of depth of winter season.
- 41-45 Frequency of daily minimum temperature at or below  
-10°F, -20°F, -30°F, -40°F, -50°F during the whole  
winter season.
- 46-50 Frequency of daily minimum temperature at or below  
-10°F, -20°F, -30°F, -40°F, -50°F during depth of  
winter season.
- 51-55 Average number of days with daily minimum tempera-  
ture at or below -10°F, -20°F, -30°F, -40°F, -50°F  
during the whole winter season.
- 56-60 Average number of days with daily minimum tempera-  
ture at or below -10°F, -20°F, -30°F, -40°F, -50°F  
during depth of winter season.
- 61-63 Daily minimum temperatures - annual rist, 1 per cent  
basis (3 to 4 occurrences per year), 2.5 per cent basis  
(9 occurrences per year), 5 per cent basis (18 occur-  
rences per year).

Data: Data were obtained from 47 stations over the ten winters from fall 1950 to  
spring 1960.

HARE, F.K.

The climate of the Island of Newfoundland: a geographical analysis. Geographical Bulletin, 2:36-88. 1952.

Sheet size:  $6\frac{1}{2}$ " x 10"

Map scale: 1:5,800,000

## List of Maps

- |        |  |
|--------|--|
| Fig. 2 | Temperature of the sea surface in July.<br>(Scale: 1:8,000,000).   |
| 3      | Extent of sea-ice in a typical January.<br>(Scale: 1:12,000,000).  |
| 4      | Extent of sea-ice in a typical March.<br>(Scale: 1:12,000,000).  |
| 5      | Mean air temperature, January.   |
| 6      | Mean monthly maximum temperature.  |
| 7      | Mean monthly minimum temperature.  |
| 8      | Mean air temperature, July.  |
| 9      | Date of beginning of persistent thaw.  |
| 10     | Date of beginning of persistent frost.   |
| 11     | Duration of season of persistent thaw.   |
| 13     | Mean annual precipitation.   |
| 14     | Mean annual snowfall.  |
| 16     | Start of vegetative season.  |
| 17     | Duration of vegetative season.   |
| 18     | Mean annual potential evapotranspiration.  |
| 19     | Moisture index (According to Thornthwaite 1948).   |
| 20     | Moisture surplus.  |
| 21     | The frequency of fog over the marine approaches<br>to Newfoundland, expressed as percentage of all<br>observations. (Scale: 1:12,000,000). |

Data: All data for period 1938-1947.

HARE, F.K., R.W. LONGLEY, et al.

The climate of Quebec and Labrador. Dept. of Transport, Met. Branch, 1953. 134p. 44 figs.

Sheet size:  $8\frac{1}{2}$ " x 13"

Map scale: 1:11,000,000

#### List of Maps

- Fig. 1 Climatic regions of Quebec/Labrador.  
2 Surface temperature of the sea, August-September  
(Scale: 1:18,000,000).  
4-11 Trajectories and percentage frequencies of polar  
continental (cold, zonal, warm), and maritime  
(Atlantic) air during January and July.  
12-13 Mean January and July pressure at sea level for  
part of the Northern Hemisphere (Scale: 1:50,000,000).  
14-15 Percentage of occasions in January and July with a  
front within 150 miles.  
16 Difference of mean annual temperature from the lati-  
tudinal mean temperature.  
17-20 Mean January, April, July, October temperatures,  
1938-1947.  
22 Mean daily range of temperature in January.  
23 Mean annual total precipitation.  
24 Mean annual snowfall.  
25-28 Mean January, April, July, October cloudiness.

Data: Temperature data are based on the period 1938-1947. Shorter periods were adjusted to this period. For other elements the available period of record was used.

HENRY, T.J.G.

Maps of upper winds over Canada. Dept. of Transport, Met. Br., Toronto, 1957. 61p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:32,000,000

List of Maps

Vector mean wind and normal geopotential height in winter, spring, summer and autumn at 850 mb., 700 mb., 500 mb., 300 mb., and 200 mb.

Standard vector deviation in winter, spring, summer and autumn at 850 mb., 700 mb., 500 mb., 300 mb., and 200 mb.

Data: Data were obtained for the 7-year base period 1946-1952 for all radiosonde stations in Canada and from selected stations in Alaska, Greenland and the northern U.S.

## KENDALL, G.R. and A.G. PETRIE

The frequency of thunderstorm days in Canada. Dept. of Transport, Met. Branch, CIR-3688, TEC-418. 21 June 1962. 17p., 9 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:35,000,000

## List of Maps

- Fig. 1      Annual average number of days with thunderstorms  
              (1941-1960).  
2-7      Average number of days with thunderstorms in May,  
              June, July, August, September and October  
              (1941-1960).  
8      Average number of days with thunderstorms from  
              November to April (1941-1960).

Data: Data from principal weather stations in Canada for the period 1941-1960 were used.

KENDALL, G.R. and S.R. ANDERSON

Standard deviations of monthly and annual mean temperatures. Dept. of Transport, Met. Br., Climatological Studies Number 4, 1966. 18p. 16 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:28,000,000

List of Maps

- Fig. 2-13 Standard deviations of mean temperature for  
each month.  
14 Standard deviation of annual mean temperature.

Data: Data were from 196 principal stations for the standard 30 year period 1931-1960.

KENDREW, W.G. and B.W. CURRIE

The climate of central Canada. Queen's Printer, Ottawa, 1955. 194p.

Sheet size:  $6\frac{1}{2}$ " x 10"

Map scale: 1:24,000,000

#### List of Maps

- Fig. 1-3 Climatic regions of central Canada and major vegetation types (Scale: 1:29,000,000).
- 4-7 Mean monthly pressures for January, April, July, October (Scale: 1:29,000,000).
- 8-9 Mean monthly pressures for western Canada and the north Pacific for January and July (Scale: 1:58,000,000).
- 10-11 Mean winter and summer positions of the frontal zones (Scale: 1:58,000,000).
- 12-15 Mean monthly temperatures for January, April, July, October. (Scale: 1:29,000,000).
- 16 Mean annual range of temperature (Scale: 1:29,000,000).
- 17-20 Mean dates of the beginning and end of winter and the beginning and end of summer.
- 21-22 Mean number of warm summer and sub-Arctic days.
- 23-24 Extreme lowest temperature and extreme highest temperature. (Scale: 1:29,000,000).
- 25-26 Mean annual maximum and minimum temperatures. (Scale: 1:29,000,000).
- 27 Mean percentage frequency of "thaw-days".
- 28 Southern limit of permafrost (Scale: 1:29,000,000).
- 30-33 Mean monthly mixing ratios for January, April, July and October (Scale: 1:29,000,000).
- 34 Mean annual total precipitation.
- 35 Mean annual snowfall.
- 36-39 Mean monthly total precipitation for January, April, July and October.
- 43 Coefficient of variation of the annual total precipitation (Scale: 1:29,000,000).
- 44 Mean number of days of the year with precipitation.
- 45-48 Mean number of spring, summer, autumn and winter days with thunderstorms (Scale: 1:29,000,000).

## List of Maps (Cont'd)

- Fig. 49      Mean annual number of days with thunderstorms.  
                  (Scale: 1:29,000,000).
- 50            The number of destructive hailstorms in a 35-year  
                  period.
- 51-52        Mean cloud amounts, January to March, and  
                  July to September.

Data: Data were obtained from 63 stations for the 30-year period preceding publication, and for a shorter period from the stations which did not have 30-year records.

KENDREW, W.G. and D.P. KERR

The climate of British Columbia and the Yukon Territory. Queen's Printer, Ottawa, 1956. 222p.

Sheet size:  $6\frac{1}{2}$ " x 10"

Map scale: 1:29,000,000

#### List of Maps

- Fig. 1 Climatic divisions of southern B.C. (Scale: 1:8,000,000).  
 3-6 Mean monthly sea-level pressures for January, April, July, October.  
 7-8 Mean monthly sea-level pressures, including the north Pacific for January and July. (Scale: 1:66,000,000).  
 12a-12b Mean winter and summer positions of the frontal zones. (Scale: 1:66,000,000).  
 13 Wind roses for Pachena Point and for the Pacific 100 miles to the west (Scale: 1:3,200,000).  
 14 Wind roses for Penticton. (Scale: 1:1,200,000).  
 15-18 Mean monthly temperatures for January, April, July and October.  
 19 Mean annual range of temperature.  
 20 Extreme minimum temperatures.  
 21-22 Mean annual minimum and maximum temperatures.  
 25 The percentage of Januarys with mean temperatures differing by 5°F or more from the long-period mean January temperature. (Scale: 1:22,000,000).  
 26-29 Mean monthly mixing ratio for January, April, July, and October.  
 30 Mean annual precipitation for southern B.C. (Scale: 1:11,000,000).  
 33 Mean annual snowfall for southern B.C. (Scale: 1:11,000,000).  
 34-36 The coefficient of variation of the precipitation for southern B.C., annual and monthly for December and July (Scale: 1:13,000,000).  
 37-40 Mean number of days with thunderstorms for spring, summer, autumn and winter.  
 41 Mean annual number of days with thunderstorms.  
 43 Climatic divisions of northern B.C. and the Yukon Territory (Scale: 1:9,700,000).  
 44-46 Wind roses and topography for Teslin, Watson Lake and Whitehorse. (Scale: 1:1,600,000).

## List of Maps (Cont'd)

- Fig. 49            Southern limit of permafrost.  
50-51            Mean annual precipitation and snowfall for  
                  northern B.C. and the Yukon Territory.  
                  (Scale: 1:9,700,000).  
54                Coefficient of variation of the annual precipi-  
                  tation in northern B.C. and the Yukon Territory.  
                  (Scale: 1:9,700,000).

Data: All available data from 96 stations in southern B.C. and 14 stations in northern B.C. and the Yukon were used.

## KLEIN, W.H.

Principal tracks and mean frequencies of cyclones and anticyclones in the Northern Hemisphere. Unites States Weather Bureau, Research Paper No. 40, 1957. 60p.

Sheet size:  $13\frac{1}{2}$ " x 15"

Map scale: 1:120,000 (at 50°N)

## List of Maps

- Charts 1-12    Frequencies of cyclones per unit area at sea level  
for each month, January to December  
(Scale: 1:70,000,000).
- 13-24    Frequencies of anticyclones per unit area at sea  
level for each month, January to December  
(Scale: 1:70,000,000).
- 25-36    Frequency of cyclogenesis per unit area at sea  
level for each month, January to December.
- 49-60    Principal tracks of cyclones at sea level for each  
month, January to December.
- 61-72    Principal tracks of anticyclones at sea level for  
each month, January to December.

Data: All available data were used.

KOPEC, R.J.

Continentality around the Great Lakes. Bull. Amer. Met. Soc., 46:2:54-57. February 1965.

Sheet size: 8" x 10 $\frac{1}{2}$ "

Map scale: 1:8,600,000

List of Maps

Isoplethic patterns of continentality coefficient  
at 1% intervals for the Great Lakes region.

Data: Data for the computations of continentality coefficients for some 480 stations within and about the region were taken from the Climatic Summary of the United States - Supplement for 1931 through 1952, published by the U.S. Weather Bureau, and Temperature and Precipitation normals for Canadian Weather Stations based on period 1921-1950, Met. Br., Dept. of Transport, Toronto, Canada.

## MATEER, C.L.

A preliminary estimate of the average insolation in Canada. Can. J. Agric. Sci., 35:6:579-594. Nov.-Dec. 1955.

Sheet size: 7" x 10"

Map scale: 1:48,000,000

## List of Maps

Fig. 5-16      Average daily insolation in Langleys for  
each month, January to December.

Data: Data were obtained from a network of 40 synoptic stations in the Canadian Arctic and sub-Arctic for the period 1945-1954, and this was extrapolated using data from a network of approximately 85 stations in southern Canada for a period in excess of 20 years.

McKAY, D.K. and F.A. COOK

A preliminary map of continentality for Canada. Geographical Bulletin, 20:76-81. 1963.

Sheet size:  $6\frac{1}{2}$ " x 10"

Map scale: 1:44,000,000

List of Maps

Fig. 1      A preliminary map of continentality for Canada  
              in per cent.

Data: Data from 205 stations for the period 1921-1950 were analysed.

McKAY, G.A.

A detailed map of prairie average annual precipitation. Dept. of Transport, Met. Br., CIR-3519, TEC-365. Aug. 2, 1961. 8p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:5,000,000

List of Maps

- Fig. 1      Average annual precipitation 1921-1950.  
     2      Summer season rainfall as a per cent of  
            annual precipitation. (Scale: 1:8,500,000).

Data: Data were from 281 Canadian stations for the period 1921 - 1950, supplemental data from American stations for the periods 1921-1950 or 1931-1952 were also used.

## McKAY, G.A.

Statistical estimates of probable maximum rainfall in the Prairie Provinces. Canada, Department of Agriculture, Prairie Farm Rehabilitation Administration. Oct. 1962. 10p. 5 figs. - Revised as Met. Report #7, Jan. 1964.

Sheet size: 17" x 11" folded to 8½" x 11" Map scale: 1:6,000,000

## List of Maps

- Fig. 3 Statistical estimates of probable maximum precipitation for point rainfall of 24-hour duration.
- 4 Estimates of probable maximum precipitation for point rainfall of 24-hour duration based on hydrometeorological report 33(3).

Data: All available data were used.

McKAY, G.A.

Persisting dew points in the prairie provinces. Canada, Department of Agriculture, Prairie Farm Rehabilitation Administration, Met. Report No. 11, March 1963. 10p. 13 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:8,700,000

List of Maps

- Fig. 1      Standard deviation of the 12 hour maximum  
              persisting dew point - July.
- 3            Difference between mean of 12th highest  
              hourly dew point in a month and the mean  
              monthly dew point - March.
- 5-12        12-hour maximum persisting dew points  
              100-year return period reduced to 1000 mbs.  
              for each month - March to October.

Data: Data were mainly obtained for the period 1950-1959.

McKAY, G.A.

Statistical estimates of precipitation extremes for the Prairie Provinces. Canada, Department of Agriculture, Prairie Farm Rehabilitation Administration, 1965. 11p. 18 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:8,000,000

List of Maps

- Fig. 2-10 Means and coefficients of variation of annual  
March to October 24-hour precipitation extremes.  
18 Ratios of rainfall extremes of similar return period  
(based on point rainfall frequency distributions).  
(Scale: 1:18,000,000).

Data: Data were obtained for the period 1921-1950.

McKAY, G.A.

Climatic maps of the prairie provinces for agriculture. Dept. of Transport, Met. Br., Climatological Studies Number 1 1965. 1p. 17 figs.

Sheet size: 22" x 17"

Map scale: 1:4,000,000

#### List of Maps

- |        |  |
|--------|--|
| Fig. 1 | Mean daily temperature for May.  |
| 2      | " " " " June.  |
| 3      | " " " " July.  |
| 4      | " " " " August.  |
| 5      | " " " " September.   |
| 6      | " " " " the year.  |
| 7      | Mean annual number of degree days above 42°F from May 1 to September 30. |
| 8      | Mean annual length of frost-free period.                                 |
| 9      | Mean date of last occurrence of a temperature of 32°F in spring.         |
| 10     | Mean date of first occurrence of a temperature of 32°F in fall.          |
| 11     | Mean amount of precipitation from May 1 to September 30.                 |
| 12     | Mean amount of precipitation from June 1 to July 31.                     |
| 13     | Mean amount of precipitation from October 1 to April 30.                 |
| 14     | Mean annual amount of precipitation.                                     |
| 15     | Coefficient of variation of growing season precipitation.                |
| 16     | Mean number of hours of bright sunshine May 1 to September 30.           |
| 17     | Mean wind speed at 30 feet during growing season.                        |

Data: With a few exceptions, data were from or were adjusted to the period 1921-1950. The exceptions are bright sunshine, wind and frost. The sunshine data were for the period 1931 to 1960, the wind data were for non-standard periods of sufficient length to establish acceptable means and the frost data varied from 2 to 72 years of record.

## MILLAR, F.G.

Surface temperatures of the Great Lakes. J. Fish. Res. Bd. Can., 9:7:329 - 376. 1952.

Sheet size:  $6\frac{1}{2}$ " x 10"

Map scale: 1:5,000,000.

## List of Maps

Fig. 16-27      Distribution of mean surface water temperature in  
the months January to December.

Data: Temperatures were continuously recorded by thermographs installed on the condenser intakes of steamships. The period of record on the courses traversed is as follows: Montreal to Fort William: 1935 to 1941. Lake Ontario, Cobourg to Charlotte: 1934 to 1946. Detroit to Fort William and Duluth: 1935 to 1940. Depot Harbour to Milwaukee and Chicago: 1936 to 1939, resumed 1941. At least 2 observations per week were available along most courses.

## MURRAY, W.A.

Rainfall intensity-duration-frequency maps for British Columbia. Dept. of Transport, Met. Br., Canada. CIR-4031, TEC-518, 29 April 1964. 8p. 9 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:8,800,000

## List of Maps

- Fig. 3-6 Twenty-four hour rainfalls for 2-year, 5-year,  
10-year and 25-year return periods.  
7-9 Six-hour rainfalls for 10-year, 5-year and  
25-year return periods.

Data: All available recording rain gauge, 6-hour and 24-hour data were used.

## MUTTITT, G.H.

Spring and summer rainfall patterns in Alberta. Dept. of Transport, Met. Br., CIR-3512, TEC-361, July 12, 1961. 22p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:7,400,000

## List of Maps

- Fig. 1a Twenty-four-hour precipitation from rainstorm of June 26, 1960.
- 1c(1)-1c(4) Examples of "Normal Rainfall" charts currently available at Edmonton, for the months of May, June, July and August.
- 2-6 Average precipitations for April, May, June, July and August (1955-60).

Data: Data were obtained from 34 forestry stations in addition to the regular network of climatological stations for this study. The period used was 1955-1960.

## PETITPAS, J.E.R. and R.A. HORNSTEIN

Plant hardiness zone map - Nova Scotia and Prince Edward Island. Dept. of Transport, Met. Br., CIR-3892, TEC-478, Sept. 19, 1963. 11p. 4 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:2,300,000

## List of Maps

- Fig. 1      Lowest minima on record since 1923.  
            (Scale: 1:3,500,000 ).
- 2          Zones of lowest minima.
- 3          Plant hardiness zone map.

Data: Annual minimum temperatures based on the 40 year period 1923-1962 were used.

## POTTER, J.G.

Monthly mean sea level pressure maps for Canada. Dept. of Transport, Met. Div., CIR-2710, TEC-224. Oct. 18, 1955. 18p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:29,000,000

## List of Maps

12      Monthly mean sea-level pressure maps.

Data: Individual mean monthly sea-level pressure maps for each of the 120 months over the period 1940-1949 were analyzed. Then, a grid system was used to calculate the mean pressure at each point for each month. The values for these points were averaged and the final monthly mean sea-level pressure maps constructed up to  $72\frac{1}{2}^{\circ}\text{N}$ . North of this latitude the maps are based on data for the period September 1948 to August 1953 adjusted to the 1940-1949 period.

POTTER, J.G.

Water content of freshly fallen snow. Dept. of Transport, Met. Br., CIR-4232, TEC-569. 12 May 1965. 8p. 4 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:34,000,000

List of Maps

Fig. 4      Ratio of measured water content of snowfall to  
an estimated water content using 10 inches of  
snowfall as equivalent to 1 inch of water.

Data: Figure 4 is based on station snowfall data from January 1963, or the month after the snow gauge was installed to the end of the snowfall season in the spring of 1964.

## POTTER, J.G.

Snow cover. Dept. of Transport, Met. Br., Climatological Studies Number 3, 1965.  
69p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:29,000,000

## List of Maps

- |           |   |
|-----------|---|
| Chart 1-3 | Earliest, median, and latest dates of first snow cover in 20 winters.   |
| 4-6       | Earliest, median, and latest dates of last snow c cover in 20 winters.  |
| 7-9       | Minimum, median, and maximum number of days with snow cover in 20 winters.                                    |
| 10        | Continuity of snow cover. Months with no breaks in snow cover. (10 winters).                                  |
| 11-13     | Least, median, and greatest of maximum winter snow cover. (20 winters).                                       |
| 14-22     | Median depths of snow cover, Sept. 30, Oct. 31, Nov. 30, Dec. 31, Jan. 31, Feb. 28, Mar. 31, Apr. 30, May 31. |

Data: All available data for the period 1941-1960 from principal climatological stations were used.

## PUTNAM, D.F. and L.J. CHAPMAN

The climate of southern Ontario. *Sci. Agric.* 18:8:401 - 446. April 1938. (In condensed form by L.J. Chapman in *Canad. geogr. J.*, 17:3:136 - 141. Sept. 1938).

Sheet size: 7" x 10"

Map scale: 1:7,000,000

## List of Maps

- |        |   |
|--------|---|
| Fig. 4 | Mean annual temperatures.   |
| 5-8    | Mean seasonal temperatures (winter, spring, summer, autumn).  |
| 9-20   | Isotherms of mean temperature for each month (from January to December).                                    |
| 21     | Annual mean daily range of temperature.   |
| 22-23  | Isotherms of lowest and highest temperature on record.  |
| 24-25  | Average dates of the beginning and end of the growing season.   |
| 26     | Average length of the growing season.   |
| 27-28  | Average dates of the last and first frosts in the spring and fall.  |
| 29     | Average length of the frost-free period.  |
| 30     | Mean annual precipitation.  |
| 31     | Mean annual snowfall.   |
| 32-33  | Average rainfall for the months April to September (inclusive), and June to August (inclusive).             |
| 34     | Thornthwaite P - E index for the three summer months.   |
| 35     | Mean annual number of days having 0.01 inch or more of precipitation.                                       |
| 36     | The frequency of droughts during the months of May, June, July, August and September over a 50-year period. |
| 37     | Mean annual cloudiness.   |
| 38     | Average percentage of possible bright sunshine received during the growing season.                          |
| 39     | Relative frequency of winds from different directions.  |
| 40     | Climatic regions.   |

Data: The data have been derived from publications of the Meteorological Service of Canada, supplemented by access to unpublished information which is on file at the central office of the Service in Toronto. These records have been compiled from the reports of a large number of weather stations in southern Ontario.

## PUTNAM, D.F.

The climate of the Maritime Provinces. *Canad. geogr. J.*, 21:3:134 - 147. Sept. 1940.

Sheet size: 7 1/4" x 10 1/4"

Map scale: 1:12,000,000

## List of Maps

- |          |  |
|----------|--|
| Fig. 3-4 | Winter and summer winds.                         |
| 5        | Mean annual temperature.                         |
| 6-9      | January, April, July, October mean temperatures. |
| 10       | Mean annual range of temperature.                |
| 11       | Mean daily range of temperature.                 |
| 12-13    | Extreme high and low temperatures.               |
| 14-15    | Beginning and end of growing season.             |
| 16       | Length of growing season.                        |
| 17-18    | Last spring frost and first autumn frost.        |
| 19       | Length of frost-free period.                     |
| 20       | Mean annual precipitation.                       |
| 21       | Mean annual snowfall.                            |
| 22       | Rainfall in summer half-year.                    |
| 23       | Frequency of summer drought in fifty years.      |
| 24       | Number of rainy days per annum.                  |
| 25       | Mean annual relative humidity.                   |
| 26       | Number of foggy days per annum.                  |
| 27       | Climatic regions (Scale: 1:5,000,000).           |

Data: Data were obtained largely from published records of the Met. Service and unpublished data from the central office in Toronto for the periods of record.

RAE, R.W.

Climate of the Canadian Arctic Archipelago. Canada, Dept. of Transport, Toronto, 1951. 90p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:35,000,000

List of Maps

- Fig. 2-7 Mean pressure for January, March, May, July,  
September and November.  
8-13 Mean temperature for January, March, May,  
July, September and November.

Data: Data were from 20 stations for the period 1922-1950 or part thereof.

## RAYNER, J.N.

Atlas of surface temperature frequencies for North America and Greenland. Arctic Meteorology Research Group, McGill University, Montreal. Publication in Meteorology No. 33, January, 1961.

Sheet size: 13" x 17"

Map scale: 1:29,000,000

## List of Maps

Monthly percentage frequencies of temperature  
below  $-50^{\circ}\text{F}$ ,  $-40^{\circ}\text{F}$ ,  $-25^{\circ}\text{F}$ ,  $0^{\circ}\text{F}$ ,  $15^{\circ}\text{F}$ ,  $32^{\circ}\text{F}$ ,  
 $50^{\circ}\text{F}$ ,  $70^{\circ}\text{F}$ ,  $85^{\circ}\text{F}$  and  $100^{\circ}\text{F}$ .

Data: Most data are from published material of the Arctic Meteorology Research Group, McGill University. United States records consist of 24 observations a day for the period 1948-1956, U.S.S.R. records consist of 8 observations a day for 5 years. Records for Canada, Greenland and western Europe are on the whole unreliable as the periods of observation vary widely and only one to four observations per day were used.

## RICHARDS, T.L. and V.S. DERCO

The role of "Lake effect storms" in the distribution of snowfall in southern Ontario. Proceedings of the 20th Meeting of the Eastern snow conference, Quebec City, Feb. 1963, p.61-86.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:2,300,000

## List of Maps

- Fig. 1      Annual snowfall in southwestern Ontario.  
3-9      Monthly snowfall in southwestern Ontario  
            October to April.

Data: Data from 232 stations based on the period 1931-1960 were used.

SABBAGH, M.E. and R.A. BRYSON

An objective precipitation climatology of Canada. The University of Wisconsin, Dept. of Meteorology, Madison, Wisc. Technical Report No. 8. April, 1962

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:29,000,000

## List of Maps

- |        |  |
|--------|--|
| Fig. 1 | Total variance.  |
| 2      | Ratio of $\frac{\text{1st harmonic variance.}}{\text{total variance}}$ |
| 3      | Ratio of $\frac{\text{2nd harmonic variance.}}{\text{total variance}}$ |
| 4      | Ratio of $\frac{\text{2nd harmonic variance.}}{\text{total variance}}$ |
| 5-12   | 1st, 2nd, 3rd, and 4th harmonic amplitudes and phase angles.           |

Data: Data were obtained from precipitation curves from some 500 stations based on the normal period 1921-1950.

## SANDERSON, M.

The climates of Canada according to the new Thornthwaite classification. *Sci. Agric.*, 28:11:501 - 517. Nov. 1948.

Sheet size: 7" x 10"

Map scale: 1:32,000,000

## List of Maps

- Fig. 2      Average annual potential evapotranspiration and climatic types.  
3      Average annual water deficiency.  
4      Average annual water surplus.  
5a      Average annual water surplus in southern Ontario and Quebec. (Scale: 1:6,600,000).  
5b      Average annual water surplus in central Canada. (Scale: 1:11,000,000).  
6      Moisture regions in Canada.  
8      Seasonal variation of effective moisture.  
9      Summer concentration of thermal efficiency.

Data: Records of mean monthly temperature and precipitation of approximately 650 weather stations were used in the computations. The number of years of record included in the normals, varies with the regions. Most have more than 20 years of record but for some of the far northern stations the normals include less than 10 years. Whenever possible, the normals were revised to 1939.

## SANDERSON, M.

Moisture relationships in southern Ontario. Sci. Agric. 30:235-255. June 1950.

Sheet size: 7" x 10"

Map Scale: 1:3,500,000

## List of Maps

- |        |  |
|--------|--|
| Fig. 1 | Average annual potential evapotranspiration.     |
| 2      | Average annual water surplus.                    |
| 3      | Average annual water deficiency.                 |
| 4      | Average annual actual evapotranspiration.        |
| 5      | Thornthwaite P-E indices and moisture provinces. |

Data: Climatic data from 83 weather stations in southern Ontario were used to compute the annual potential evapotranspiration.

## STORR, D.

Maximum one-day rainfall frequencies in Alberta. Dept. of Transport, Met. Br., CIR-3796, TEC-451, Feb. 25, 1963. 8p. 19 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:6,000,000

## List of Maps

- Fig. 3-14 One-day rainfalls for May, June, July and August  
for 5-year, 10-year and 25-year return periods.  
15-17 One-day rainfalls for the season (May - August)  
for 5-year, 10-year and 25-year return periods.

Data: Data were from 73 stations for the period 1916-1960.

## STORR, D.

Maximum one-day rainfall frequencies in Saskatchewan. Dept. of Transport, Met. Br., CIR-4078, TEC-528, July 24, 1964. 6p. 20 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:4,400,000

## List of Maps

- Fig. 1-3 One-day rainfalls in May - September season for  
5-year, 10-year and 25-year return periods.  
4-18 One-day rainfalls in May, June, July, August  
and September for 5-year, 10-year and 25-year  
return periods.

Data: Data were extracted from the Monthly Record of Meteorological Observations for 75 stations for the months May to September.

## SPORNS, U.

Rainfall intensity-duration-frequency maps for Ontario. Dept. of Transport, Met. Br., CIR-3895, TEC-480, Sept. 20, 1963. 5p. 9 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:8,800,000

## List of Maps

- Fig. 1-4      Maximum 24-hour precipitation for 5-year, 10-year, 25-year, and 50-year return periods.
- 5              Maximum 3-hour, 12-hour, 18-hour, 48-hour, and 72-hour precipitation in per cent of the 24-hour values.

Data: All available data from recording rain gauge stations and from principal and ordinary climatological stations were used.

## SUMNER, A.S.

Standard deviation of mean monthly temperatures in Anglo-America. Geogr. Rev., 43:1:50 - 59. Jan. 1953.

Sheet size:  $6\frac{1}{2}" \times 9\frac{1}{2}"$

Map scale: 1:105,000,000

## List of Maps

- Fig. 1-12      Monthly maps of the U.S. and Canada having values of standard deviation from January to December inclusive.
- 13-14      Range between the highest and lowest monthly means in the U.S. and Canada for January and July.

Data: Temperature data from more than 111 stations for the period 1896-1945 were used in this study.

## SWITHINBANK, C.

Ice atlas of Arctic Canada. Prepared at the Scott Polar Research Institute, Cambridge, England. Canada Defence Research Board, 1960. Queen's Printer. Cat. No. DR3-1060.

Sheet size: 20" x 34"

Map scale: 1:6,300,000

## List of Maps

Frequency charts and ice summaries for March 1-31;  
April 1-15, 16-30; May 1-7, 8-15, 16-23, 24-31;  
June 1-7, 8-15, 16-23, 24-30; July 1-7, 8-15,  
16-23, 24-31; August 1-7, 8-15, 16-23, 24-31;  
September 1-7, 8-15, 16-23, 24-30; October 1-7,  
8-15, 16-23, 24-31; November 1-15, 16-30.  
Mean extent of frost ice for April, May, June,  
July, August. (Scale: 1:16,000,000).

Data: Every available ice observation from 1900 onwards for selected stations spaced 55 miles apart throughout the area were used.

## THOMAS, M.K.

Climatological atlas of Canada. National Research Council, Division of Building Research, Canada and Dept. of Transport, Met. Div., National Research Council No. 3151, Ottawa, 1953. 253p.

Sheet size: 9" x 12"

Map scale: 1:32,000,000

## List of Maps

- |                          |   |
|--------------------------|---|
| Chart 1-1, -4,<br>-5, -8 | Mean daily temperature January, April, July and October.  |
| 1-2, -6                  | Mean daily minimum temperature January and July.  |
| 1-3, -7                  | Mean daily maximum temperature January and July.  |
| 1-9, -10,<br>-11         | Mean annual temperature, maximum and minimum temperature.                                       |
| 1-12, -13                | Extreme highest and lowest temperature 1921-1950.   |
| 1-14, to<br>-21          | Winter and summer design temperature 1%, 2½%, 5% and 10% basis.                                 |
| 1-22                     | Mean annual total degree days (65°F base).  |
| 2-1 to<br>-4             | Mean vapour pressure January, April, July and October.  |
| 3-1                      | Computed maximum gust speed.  |
| 3-2 to<br>-5             | Computed January, April, July and October maximum gust speed.                                   |
| 3-6 to<br>-9             | Mean seasonal wind speeds.  |
| 3-10 to<br>-12           | Direction frequencies of annual, winter and summer winds.                                       |
| 4-1                      | Maximum recorded depth of snow on the ground (1941-1950).                                       |
| 4-2                      | Computed maximum snow load (Horizontal surface).  |
| 4-3                      | Mean annual snowfall.   |
| 4-4 to<br>-10            | Mean monthly snowfall October to April.   |
| 4-11                     | Mean annual number of days with measurable snowfall.  |
| 5-1                      | Mean annual total precipitation.  |
| 5-2                      | Mean annual rainfall.   |
| 5-3 to<br>-6             | Mean seasonal rainfall.   |
| 5-7 to<br>-10            | Mean number of days with total precipitation 0.1" or more for January, April, July and October. |
| 5-11                     | Maximum precipitation in twenty-four hours (1921-50).   |

## List of Maps (Cont'd)

Chart 5-12	Fifteen-minute rainfall to be expected once in ten years.
6-1	Mean annual total hours of bright sunshine.
6-2 to -13	Mean total hours of bright sunshine for each month.
8-1	Limit of permafrost.

Data: In preparing these maps the following records were used: Temperature - 450 stations with varying lengths of record with most of them from 20 to 40 years. Precipitation - similar periods of record to the temperature stations. Humidity - 75 stations with several years of observation during the 1940's. Wind - 175 stations with varying records from 5 to 25 years. Sunshine - 100 stations with records of 10 to 70 years and 25 stations with shorter records.

THOMAS, M.K. and D.W. BOYD

Wind chill in northern Canada. The Canadian Geographer, 10:29 - 39, 1957.

Sheet size: 7" x 9½"

Map scale: 1:44,000,000

List of Maps

- |        |   |
|--------|---|
| Fig. 2 | Mean temperature for January.                             |
| 4      | Mean wind speed for January.                              |
| 5-8    | Mean wind chill factor for January, April, July, October. |
| 9      | Mean annual number of degree days.                        |
| 10     | Extreme lowest recorded temperature (1921-1950).          |
| 11     | Mean wind chill factor (annual).                          |

Data: Temperature data for period 1921-1950 and wind data for irregular periods ending in 1954 were used.

## THOMAS, M.K. and G.R. KENDALL

Climatic regions of Canada, and the growing season in Canada. In the Canadian Oxford Atlas of the World, Oxford University Press, (Second Edition), 1957. p.3.

Sheet size:  $10\frac{1}{2}$ " x  $15\frac{1}{2}$ "

Map scale: 1:24,000,000

## List of Maps

Climatic regions.

The growing season: (a) Total average precip.

April-August. (b) Mean annual degree days  
above 42°F.

Data: All available data were used in preparing these maps.

## THOMAS, M.K.

Snowfall in Canada, Dept. of Transport, Met. Br., CIR-3977, TEC-503, Jan. 24, 1964. 16p.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:3,300,000

## List of Maps

- Fig. 1      Mean annual snowfall (1931-1960).  
              (Scale: 1:32,000,000).
- 2      Mean annual snowfall in southern Ontario  
              (1931-1960).
- 3      Mean annual snowfall in Greater Toronto, data  
              adjusted to 1921-1950 period. (Scale: 1:220,000).

Data: Mean snowfall data are based on the period 1931-1960 while extreme snowfall data are for the period of record.

## THOMAS, M.K.

A survey of Great Lakes snowfall. Proc. seventh conference on Great Lakes research, April 1964. Pub. No. 11, Great Lakes Research Division, The University of Michigan, 1964. p.294-310.

Sheet size: 7" x 10"

Map scale: 1:13,000,000

## List of Maps

- |        |  |
|--------|--|
| Fig. 1 | Average annual snowfall (1895-1910), Great Lakes.  |
| 2      | Mean annual snowfall, Canada (1931-1960).<br>(Scale: 1:44,000,000).  |
| 3      | Mean annual snowfall in southern Ontario (1931-1960).<br>(Scale: 1:5,300,000).   |
| 4      | Mean annual total snowfall, Great Lakes (1931-1960).   |
| 5      | Mean annual snowfall, southern Ontario (1951-1960).<br>Average number of days with measurable snowfall,<br>southern Ontario (1951-1960). (Scale: 1:8,800,000). |
| 6      | December 1962 snowfall - Great Lakes.  |
| 7      | Some snowfall extremes around the Great Lakes.   |

Data: The periods of record are stated on each map.

## THOMPSON, H.A.

Freezing and thawing indices in northern Canada. Proc. of the first Canadian conference on permafrost. p.18-36. National Research Council of Canada, Associate Committee on Soil and Snow Mechanics, Technical Memorandum, No. 76. Ottawa Jan. 1963.

Sheet size: 7" x 9 $\frac{1}{2}$ "

Map scale: 1:29,000,000

## List of Maps

- |        |  |
|--------|--|
| Fig. 1 | Freezing indices.                                  |
| 2      | Thawing indices.                                   |
| 3      | Mean date of the beginning of the freezing season. |
| 4      | Mean date of the end of the freezing season.       |

Data: Data from 40 stations in northern Canada for the period from July 1949 to December 1959 were used.

## THOMPSON, H.A.

Air temperatures in northern Canada with emphasis on freezing and thawing indices. Proceedings Permafrost International Conference, 11-15 November 1963, Lafayette Indiana. p.272-280. Publication No. 1287 National Academy of Science.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:16,900,000

## List of Maps

- |           |  |
|-----------|--|
| Fig. 1, 2 | Mean January and July daily temperature.       |
| 3         | Mean annual temperature                        |
| 4         | Mean freezing indices.                         |
| 5         | Mean thawing indices.                          |
| 6         | Mean date of the start of the freezing season. |
| 7         | Mean date of the start of the thawing season.  |

Data: The data are for the period 1951-1960.

TITUS, R.L.

Upper air climate of Canada - Charts of monthly geopotential temperature and humidity 1951-1960. Dept. of Transport, Met. Br. 1967. (103pp.)

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:39,000,000

List of Maps

Charts for each month of average altitude (gpm) and temperature ( $^{\circ}\text{C}$ ) for the standard pressure levels: 850 mb., 700 mb., 500 mb., 300 mb., 200 mb., 150 mb., and 100 mb.

Charts for each month of average humidity for standard pressure levels of 850 mb., 700 mb., and 500 mb.

Data: The charts are based on values contained in "Upper air climate of Canada - Average, extreme and standard deviation values 1951-1960".

## U.S. OFFICE OF NAVAL OPERATIONS

U. S. Navy Marine Climatic Atlas of the World. Vol. I, North Atlantic Ocean. NAVAER, No. 50-IC-528, Nov. 1955. 17p. 275 charts.

Sheet size:  $13\frac{1}{2}$ " x 20"

Map scale: 1:25,000,000

## List of Maps

Chart 14, 52,	Air sea temperature differences for January, April,
90, 128	July, October.
15, 53,	Low pressure centers for January, April, July,
91, 129	October.
2-153 less	Surface winds, gales, visibility, low visibility,
above charts	precipitation cloudiness, wind-visibility-cloudi- ness, ceiling and visibility, temperature, wet-bulb temperature, low temperature, sea level pressure for January to December.
156-275	Seasonal charts for wind aid, wind retard, wind roses, height of pressure surface, temperature and humidity at 850, 700, 500, 300 and 200 mb. levels and for modified reflective index, inversions, height of tro- popause, height of freezing level, potential aircraft icing.

Data: Surface data are from ten locations for the period 1945-1954 or less plus tran-  
sient ships' logs. Radiosonde data were obtained from 34 stations for the period 1941-  
1954 or less plus transient ships' logs.

Note: Many of these maps have been reproduced in "Climatological and Oceanogra-  
phic Atlas for Marines, Volume I, North Atlantic Ocean, 1959.

U.S. OFFICE OF NAVAL OPERATIONS

U.S. Navy Marine Climatic Atlas of the World. Vol. II, North Pacific Ocean. NAVAER, No. 50-IC-529, July 1956. 18p. and 275 charts.

Sheet size:  $13\frac{1}{2}$ " x 20"

Map scale: 1:25,000,000

List of Maps

Same map titles as in Vol. I - "North Atlantic Ocean".

Data: Surface data were from 9 locations for the period 1945-1955 or less in the North Pacific Ocean, plus transient ships' logs. Radiosonde data were from 35 locations for the period 1946-1955 or less, plus transient ships' logs.

## U.S. OFFICE OF NAVAL OPERATIONS

U. S. Navy Marine Climatic Atlas of the World. Volume VI, Arctic Ocean.  
NAVWEPS 50-IC-533, Feb. 1963. 16p. and 293 charts.

Sheet size: 13½" x 20"

Map scale: 1:25,000,000

## List of Maps

Chart 1	Surface stations.
2	Annual mean temperatures.
3	" air temperature during snow.
4	" wind chill index.
5	" low air temperature.
6	" precipitation.
7	" snow cover.
8	" sea level pressure.
9	" low visibility.
10	Daylight and darkness.
11-148	Monthly ( January-December ) charts of: surface wind. air temperature by wind direction. air temperature vs. wind speed. precipitation by wind direction. cloudiness. low visibility by wind direction. visibility. wind-visibility-cloudiness. storm tracks. gale persistence (May-July excluded). low temperature persistence (May-July excluded). low visibility persistence.
149	Upper air stations.
150-293	Monthly ( January-December ) charts of: wind (950-300 mb. ). wind (300-20 mb.). wind aid and retard (850 and 700 mb.). wind aid and retard (300 and 200 mb.). height (950 to 300 mb.). height (300 to 20 mb.). temperature (950 to 300 mb.). temperature (300 to 20 mb.).

List of Maps (Cont'd)

- inversions.
- height of tropopause.
- relative humidity.
- refractive index gradient.

Data: Surface data were from 27 locations for period 1946-1961 or less, plus transient ships' logs.

Upper air data were from 54 locations for period 1949-1961 or less, plus transient ships' logs.

## U.S. WEATHER BUREAU

Normal weather charts for the Northern Hemisphere. U. S. Dept. of Commerce, Technical Paper No. 21, Oct. 1952. 74p.

Sheet size:  $13\frac{1}{2}$ " x 15"

Map scale: 1:58,000,000

## List of Maps

Sea level pressure (mb.) for the months of January to December. 700 mb. height (10's of ft.). Temperatures ( $^{\circ}\text{C}$ ) for the months of January to December. Thickness (10's of ft.) (700 mb. height 1000 mb. height) for the months of January to December. 500 mb. height (10's of ft.) for the months of January to December.

Data: Sea level pressure data were from the 20-year period 1909-1914, 1924-1937, with data taken from the analyzed Historical Weather Maps in most of the Hemisphere, and from station records in the southwestern U.S. In the polar region data were from an adjustment of the 1946-1950, 5-year mean to the level of the earlier 20-year mean. In the southwestern U.S. and Mexico, data were obtained from station records for the same 20-year period.

700 mb. height data were from the period 1946-1950, and adjusted to the earlier 20-year period; using departure data obtained from stations with long records.

700-1000 mb. thickness data were obtained directly from the new normals for sea level pressure and 700 mb. height.

700 mb. temperature data were prepared by a method suitable to that used for the 700 mb. normal heights.

500 mb. height data were considered as simply the sum of the new 700 mb. normal height and the old 500-700 mb. thickness.

## VILLENEUVE, G.O.

Climatic conditions of the province of Quebec, and their relationship to the forests. Meteorological Bureau, Dept. of Lands and Forests, Province of Quebec, Bulletin No. 6, Quebec 1946. 123p.

Sheet size: 6" x 9"

Map scale: 1:8,800,000

## List of Maps

- 1 Mean annual temperature.
- 2 Mean temperature for July.
- 3 Mean temperature for January.
- 4 Annual range of mean monthly temperature.
- 5 Mean maximum temperature in July.
- 6 Mean minimum temperature in January.
- 7 Range of mean extreme temperatures.
- 8 Mean monthly range of temperature for the year.
- 9 Mean monthly range of temperature in July.
- 10 Mean temperature for the four warmest months.
- 11 Average length of the frost free-period.
- 12 Mean annual precipitation.
- 13 Mean monthly summer precipitation.
- 14 Mean monthly summer evaporation.
- 15 Mean maximum evaporation in summer.
- 16 Mean monthly relative humidity during summer.
- 17 P - E quotient for the summer.
- 18 P - E index for the summer.

Data: All available data were used.

## VOWINCKEL, E.

Cloud amount and type over the arctic. Arctic Meteorology Research Group, McGill University, Montreal. Publication in meteorology No. 51 June 1962.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:44,000,000

## List of Maps

Monthly mean cloud amounts, January-December  
(Scale: 1:35,000,000).

Percentage frequency of St & Sc, Cu & Cb, Ac & As,  
Ci for spring, summer, autumn and winter.

Data: Data from 32 Canadian stations were used in this study of clouds in the arctic. The data were based on three to six-years ending in 1960.

## WALKER, E.R.

A synoptic climatology for parts of the western Cordillera. Arctic Meteorology Research Group, McGill University, Montreal. Sci. Report No. 8, publication in meteorology No. 35. Feb. 1961.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: As stated with each map

## List of Maps

- Fig. 8      Precipitable moisture for January, April, July, October.  
(Scale: 1:13,000,000).
- 9      Precipitable moisture with flow of different directions  
for January, April, July, October. (Scale: 1:15,000,000).
- 11      Mean frontal positions for winter and summer.  
(Scale: 1:35,000,000).
- 15      Annual precipitation characteristics by flow direction,  
calm in centre.  
(a) Percentage of flow direction.  
(b) Percentage of total precipitation.  
(c) Precipitation.  
(d) Days of precipitation.  
(e) Average amounts per day of precipitation.  
(f) Percentage of days with rain.  
(g) Percentage of days with snow.  
(Scale: 1:15,000,000).
- 16      Winter precipitation characteristics by flow direction.  
Calm in centre.  
(a) Percentage of flow direction.  
(b) Percentage of total precipitation.  
(c) Precipitation.  
(d) Days of precipitation.  
(e) Average amounts per day of precipitation.  
(f) Percentage of days with rain.  
(g) Percentage of days with snow.  
(Scale: 1:15,000,000).
- 17      Summer precipitation characteristics by flow direction.  
Calm in centre.  
(a) Percentage of flow direction.  
(b) Percentage of total precipitation.  
(c) Precipitation.  
(d) Days of precipitation.  
(e) Average amounts per day of precipitation.  
(f) Percentage of days with rain.  
(Scale: 1:13,000,000).

## List of Maps (Cont'd)

- Fig. 21 Days of measurable precipitation in 1956 with westerly, southwesterly and southerly flows. (Scale: 1:6,300,000).
- 32 Annual precipitation in 1956 falling with westerly, southwesterly and southerly flows. (Scale: 1:6,300,000).
- 35 Average annual precipitation. (Scale: 1:6,300,000).
- 36 Daily minimum temperature by flow direction. Calm in centre. Annual, winter, spring, summer and autumn means. (Scale: 1:15,000,000).
- 37 Daily minimum temperatures by flow direction. Calm in centre. Annual, winter, spring, summer and autumn means. (Scale: 1:15,000,000).
- 38 Winter season: mean daily minimum temperatures with northerly winds and southwesterly winds. (Scale: 1:13,000,000).

Data: Daily synoptic weather chart data were obtained for the period 1954-1958.

WALKER, E.R.

Intermonthly precipitation changes in Canada, Dept. of Transport, Met. Br., CIR-3807, TEC-458. Feb. 25, 1963.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:28,000,000

List of Maps

Fig. 1-12      December-January, January-February, . . . . .  
November-December, month to month changes  
in precipitation.

Data: Precipitation normals based on the period 1921-1950 were used.

## WALKER, E.R.

Analysis of normal monthly precipitation over Alaska and western Canada. Dept. of Transport, Met. Br., CIR-4043, TEC-522, May 25, 1964. 7p. 15 figs.

Sheet size:  $8\frac{1}{2}$ " x 11"

Map scale: 1:25,000,000

## List of Maps

- Fig. 1      Percentage variance of normal precipitation  
             explained by first three harmonics.
- 2          Ratio of second harmonic amplitude to first  
             harmonic amplitude precipitation.
- 3-8        Amplitudes and phase angles of first, second  
             and third harmonics of precipitation.
- 9-15      Intermontly changes in normal precipitation,  
             April to May; May to June; June to July;  
             July to August; August to September;  
             September to October; October to November.

Data: Precipitation data from 75 weather stations in Alaska and western Canada were used in this report.



# SUBJECT INDEX

Part IV - 1

	National	Regional
Air masses . . . . .	-	II - 1
Air pressure see barometric pressure . . . . .	-	-
Anticyclones see storm tracks . . . . .	-	-
Barometric pressure . . . . .	I - 1	II - 1
Bright sunshine . . . . .	I - 1	II - 1
Climatic regions . . . . .	I - 1	II - 2
Clouds . . . . .	I - 1	II - 2
Continentality index . . . . .	I - 1	II - 2
Cyclones see storm tracks . . . . .	-	-
Design temperatures see temperature . . . . .	-	-
Degree days . . . . .	I - 2	II - 2,3
Dew point temperature see humidity . . . . .	-	-
Drought see precipitation . . . . .	-	-
Dry-bulb temperature see temperature . . . . .	-	-
Evaporation . . . . .	-	II - 3
Evapotranspiration . . . . .	I - 2	II - 3
Fog . . . . .	I - 2	II - 4
Freeze Thaw frequencies . . . . .	I - 2	-
Freezing-thawing indices see degree days . . . . .	-	-
Freezing season . . . . .	-	II - 4
Fronts . . . . .	-	II - 4
Frosts . . . . .	I - 2	II - 4,5
Frost-free period see frosts . . . . .	-	-
Growing degree-days see degree days . . . . .	-	-
Growing season . . . . .	I - 3	II - 5
Hail . . . . .	-	II - 5
Heating degree-days see degree days . . . . .	-	-
Humidity . . . . .	I - 3	II - 5,6
Ice . . . . .	I - 3,4	II - 6
Insolation see radiation . . . . .	-	-
Lake ice see ice . . . . .	-	-
Mixing ratio see humidity . . . . .	-	-

	National	Regional
Persisting dew points see humidity . . . . .	-	-
Permafrost . . . . .	I - 4	II - 6
Potential evapotranspiration see evapotranspiration . . . . .	-	-
Precipitation . . . . .	I - 4,5	II - 6,7,8,9
Pressure see barometric pressure . . . . .	-	-
Pressure tendency see barometric pressure. . . . .	-	-
Radiation . . . . .	I - 5	-
Rainfall. . . . .	I - 5	II - 9
Rainfall intensity see rainfall . . . . .	-	-
Relative humidity see humidity . . . . .	-	-
Sea ice see ice . . . . .	-	-
Sea level pressure see barometric pressure . . . . .	-	-
Sky cover see clouds . . . . .	-	-
Snow cover . . . . .	I - 5	-
Snowfall . . . . .	I - 6	II - 10,11
Snowfall water equivalent see snowfall . . . . .	-	-
Snow loads. . . . .	I - 6	-
Snow surveys see snow cover . . . . .	-	-
Solar radiation see radiation . . . . .	-	-
Station pressure see barometric pressure . . . . .	-	-
Storm tracks . . . . .	I - 6	-
Sunshine see bright sunshine . . . . .	-	-
Temperature . . . . .	I - 6,7	II - 11,12,13,14
Thunderstorms . . . . .	I - 7	II - 14,15
Upper air precipitable water . . . . .	-	II - 15
Upper air pressure heights . . . . .	I - 8	-
Upper air pressure thickness . . . . .	I - 8	-
Upper air temperature . . . . .	I - 8	-
Upper winds . . . . .	I - 8	-
Vapour pressure see humidity. . . . .	-	-
Water balance . . . . .	I - 8	II - 15
Water temperature . . . . .	-	II - 15
Wet bulb temperature see humidity. . . . .	-	-
Wind . . . . .	I - 8,9	II - 16
Wind chill. . . . .	-	II - 16
Wind loads see wind . . . . .	-	-

## APPENDIX

## CANADIAN CLIMATIC MAPS IN PREPARATION

by the

METEOROLOGICAL BRANCH

(As of July 1, 1967)

A number of climatological publications containing climatic maps are in preparation in the Climatology Division, Meteorological Branch Headquarters and the following paragraphs contain information on those which are expected to be published before July 1, 1968.

1. Climatological Studies No. 5 - The Climate of Southern Ontario.

This study will contain about 30 climatic maps of southern Ontario. The page size will be  $8\frac{1}{2}$ " x 11", and the scale approximately 1:1,700,000. The maps, which are based on data from the 1931-1960 period, include mean annual temperature, mean daily, mean daily maximum and mean daily minimum temperature for the months of January, April, July and October, mean annual precipitation and snowfall, frost-free and growing periods, climatic regions, etc. It is expected that this publication will be available early in 1968.

2. Climatological Studies No. 6 - The Climate of Northern Ontario.

This is a companion volume to the Climate of Southern Ontario and contains a similar list of maps on  $8\frac{1}{2}$ " x 11" paper. The approximate scale will be 1:5,000,000. It is expected that this publication will be available early in 1968.

3. Climatological Studies No. 8 - Atlas of Rainfall Intensity-Duration-Frequency Maps for Canada.

Generalized maps showing rainfall extremes for 2, 5, 10 and 25-year return periods and durations ranging from 5 mins. to 72 hrs. will be presented in this atlas. The publication will replace similar information published in 1959 as Technical Circular 3243, and is based on more data from a larger number of stations. It is hoped that this publication will be available late in 1967.

4. The Climate of The Canadian Arctic.

This article will appear in the 1967 Canada Year Book, and reprints are expected to be available late in the summer of 1967. The article includes two maps showing mean daily temperatures in northern Canada in January and July, based on data from the period 1951 through 1960.

## 5. Provisional Evaporation Maps of Canada.

These generalized maps showing evaporation estimates for small water bodies will be published in 1967. Monthly maps for the period May to October and annual maps have been prepared from short period United States Weather Bureau Class A Evaporation Pan Records. These records have been augmented by computations of evaporation at stations with solar radiation and sunshine data.

## 6. Climatic Maps of Canada.

A new series of Canadian climatic maps has been planned, and it is hoped to publish the temperature, precipitation and pressure series in 1967. Temperature and precipitation maps are based on data from the period 1931 to 1960, while the pressure maps have been drawn from data computed over the period 1941 to 1960. The maps will be published on  $22\frac{1}{2} \times 17$ " sheets, the temperature and precipitation maps will be published one to a page, scale 1:12,500,000, while the pressure maps will be published four to a page, scale 1:25,000,000. The maps will be published in loose leaf format as available and covers will be made available at a later date. Maps of humidity, bright sunshine, cloudiness, radiation, etc. will be issued later.



